

STAR LAKE

OCONTO County

2016 Fish Management Report

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SUMMARY

Lake and Location:

Star Lake, Oconto County, T32N R15E Section 26

Physical / Chemical attributes (Carlson et al. 1977):

Surface acres: 63

Maximum depth (ft): 21

Lake type: Seepage lake

Basic water chemistry: Slightly alkaline with moderate transparency.

Littoral substrate: 40% sand, 10% gravel, and 50% muck.

Other features: Two boat landings, one on the south shoreline and one on the north shoreline, provide access to Star Lake. The shoreline is 98% upland, consisting of mixed hardwoods and conifers, and 2% wetland composed primarily of coniferous bog.

Purpose of Survey:

Determine current status of fishery.

Surveys:

WDNR Survey ID: 515081420 - Fisheries assessment; Late spring bass and panfish; June 8, 2016.

Fishery:

Largemouth bass and bluegill are abundant. Yellow perch, rock bass, black crappie, green sunfish, and yellow bullhead are present.

EXECUTIVE SUMMARY

- Star Lake is a 63-acre lake located in northwestern Oconto County in the Town of Doty. Public boat landings on the north and south shorelines provide good access to the lake.
- Star Lake is slightly alkaline and has moderate water clarity. Littoral substrate is dominated by muck and sand, but a few areas of gravel are present.
- Historical stocking records from 1939 through 1979 show stocking of largemouth bass was most common, with less frequent stockings of bluegill, yellow perch, and northern pike (Table 1).
- Overall, 136 fish representing 7 species were collected during the 2016 survey (Table 4). The most abundant species collected were largemouth bass (74%) and bluegill (15%). Additional species collected consisted of yellow perch (4%), rock bass (3%), black crappie (1%), green sunfish (1%), and yellow bullhead (1%).
- A total of 102 largemouth bass was collected and accounted for 74% of the total fish collected (Table 4). Catch per unit effort (CPUE) from the 2016 electrofishing survey was 68.0/mile. Largemouth bass collected ranged in size from 3.1 to 15.8 inches (Figure 2). A subsample of 61 largemouth bass was aged from 1 to 11 years old. Growth of largemouth bass was below average compared to the average length at age for largemouth bass in northern Wisconsin (Figure 3).
- A total of 21 bluegill was collected and accounted for 15% of the total fish collected (Table 4). CPUE from the 2016 electrofishing survey 14.0/mile. Bluegill collected ranged in length from 3.8 to 6.9 inches (Figure 4). A subsample of 20 bluegill was aged from 3 to 4 years old. Based on a limited sample of ages, growth appears to be slightly above average.

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INTRODUCTION

Star Lake is 63-acre seepage lake located in northwestern Oconto County near the Town of Doty (Figure 1). Star Lake is slightly alkaline, with moderate water clarity. The littoral substrate is composed of 50% muck, 40% sand, and 10% gravel. The shoreline is approximately 1.5 miles and is primarily upland (98%), consisting of mixed hardwoods and conifers, but a small coniferous bog (2%) is present. Two public boat ramps, one on the north shoreline and the other on the south shoreline, provide access to Star Lake.

Historical stocking records from 1939-1979 provide accounts of several fish species being stocked by the Star Lake Association (Table 1). Species stocked consisted of bluegill, yellow perch, largemouth bass, and northern pike. Largemouth bass was the most frequently species stocked with several plantings occurring between 1944 and 1953.

The last fisheries survey by the Wisconsin Department of Natural Resources (WDNR) on Star Lake was in 1994. The goal of the survey was to determine the status of the fishery due to concerns of poor fishing by property owners. A one-night electrofishing survey in late August was utilized to evaluate the fishery in 1994.

The most recent survey was conducted in June 2016 and consisted of a 1-night electrofishing survey. The goal of the 2016 survey was to assess the fishery based on relative abundance, proportional stock density (PSD), relative stock density (RSD), CPUE, and mean length at capture/age. Due to the differences in survey timing and changes in WDNR fish sampling protocols, it will be difficult to detect changes in the fishery; but comparisons will be made when and where appropriate.

METHODS

Data collection:

A standard WDNR direct current electrofishing boat was used to collect fish on Star Lake. All fish collected were measure to the nearest 0.1 inch total length (TL) and separated into 0.5 inch length bins. A sub-sample of scales or dorsal spines was collected for age and growth analysis from all gamefish. Aging structures (scales or spines) were collected from five non young-of-year (YOY) fish per half inch bin. If sex could be determined, structures from five fish per sex were collected per half inch bin. Aging structures for panfish and nongame fish consisted of 5 samples per half inch group when sex could not be established. Ages were assigned to each fish using standard WDNR procedures.

Data analysis:

Proportional stock density (PSD) and relative stock density for preferred length fish (RSD^P) were calculated for dominant gamefish (Anderson and Neumann 1996). Preferred lengths of various gamefish have a minimum length between 45 and 55% of the world record length for that species (Table 2; Anderson and Neumann). Stock, quality, and preferred lengths

used were proposed by Gabelhouse (1984), Anderson and Neumann (1996), and Bister et al. (2000) (Table 2). CPUE was calculated as catch divided by sampling effort (miles) for each species collected. Mean length at capture/age was calculated for all dominant gamefish and compared to the average of mean length at age for northern Wisconsin during June and July.

RESULTS

Overall, 136 fish representing 7 species were collected during the 2016 survey (Table 4). The most abundant species collected were largemouth bass (74%) and bluegill (15%). Additional species collected consisted of yellow perch (4%), rock bass (3%), black crappie (1%), green sunfish (1%), and yellow bullhead (1%).

A total of 102 largemouth bass was collected and accounted for 74% of the total fish collected (Table 4). CPUE from 2016 electrofishing survey was 68.0/mile (Table 5). Largemouth bass collected ranged in size from 3.1 to 15.8 inches (Figure 2). Largemouth bass PSD was 36 and RSD^P was 2. Neither PSD or RSD^P were within the desirable range for a balanced population (Table 2). Twelve percent of largemouth bass collected were over the 14-inch minimum length limit. A subsample of 61 largemouth bass was aged from 1 to 11 years old. Growth of largemouth bass was average until age 6, but below average at older ages compared to the mean length at age for largemouth bass in northern Wisconsin during June and July (Figure 3).

A total of 21 bluegill was collected and accounted for 15% of the total fish collected (Table 4). CPUE from the 2016 electrofishing survey was 14.0/mile (Table 5). Bluegill collected ranged in size from 3.8 to 6.9 inches (Figure 4). Bluegill PSD was 29 and RSD^P was 0. Bluegill PSD was within the desirable range for a balanced population (Table 2). Forty percent of bluegill collected were ≥ 6 inches, which is often considered to be the minimum size anglers will harvest. A subsample of 20 bluegill was aged from 3 to 4 years old. Based on a limited sample of ages, growth appears to be average (Figure 5).

Yellow perch were the third most abundant fish species collected during the survey, however, yellow perch only represented 4% of the total catch. Yellow perch CPUE was 4.0/mile (Table 5). Yellow perch ranged in size from 3.7 to 5.9 inches (Figure 6). All yellow perch were within the stock length category (Table 2) and below the minimum length where anglers begin to harvest (generally 6 inches).

Additional species collected during the 2016 survey included rock bass, black crappie, green sunfish, and yellow bullhead, accounting for approximately 7% of all fish collected (Table 4).

DISCUSSION

Since the previous survey in 1994, fish sampling protocols have changed. Changes occurred in the timing of sampling periods with regards to the species being targeted. The most recent survey on Star Lake in 2016 was conducted in mid-June to specifically target bass and panfish, while the survey in 1994 was conducted late August. The differences in timing between the two surveys make it difficult to compare and determine changes in fish populations between surveys.

In 2016, largemouth bass were the most abundant species collected in the survey making up 74% of the total catch, compared to only 36% of the total catch in the 1994 survey (Table 4). Largemouth bass CPUE was greater in the 2016 survey (68.0/mile) compared to the 1994 survey (56.7/mile; Table 5). The increased catch rate in the 2016 survey is likely due to the timing of the survey. Largemouth bass tend to spawn in Wisconsin from late April to early July. After spawning, largemouth bass protect their nests, making them more susceptible to capture during electrofishing.

Bluegill abundance was similar between the 1994 and 2016 surveys (Table 4). In the 2016, survey bluegill CPUE was 14.0/mile and slightly higher than the 16.7/mile observed in 1994 (Table 5). The survey in 2016 occurred in mid-June, likely during the peak spawning period for bluegill, so it would be expected to have higher catch rates in the 2016 survey compared to the 1994 survey which was conducted in late August.

A large decline in rock bass relative abundance was observed between the 1994 and 2016 surveys (Table 4). Rock bass CPUE decreased from 65.3/mile in the 1994 survey to 2.7/mile in 2016. The observed decrease abundance could be due to the timing of the survey as was previously discussed.

The 2016 fisheries survey on Star Lake indicated good numbers of largemouth bass and bluegill. Good reproduction and recruitment was evident for both species. Star Lake will provide anglers a respectable fishing opportunity. Access to Star Lake is available to anglers from both the north and south sides of the lake but shore fishing opportunities are limited. Boaters are reminded to remove all vegetation from their boat and trailer before leaving to limit the spread of invasive species.

LITERATURE CITED

- Anderson, R. O. and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-481 *in* B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Bister, T. J., D. W. Willis, M. L. Brown, S. M. Jordan, R. M. Neumann, M. C. Quist, and C. S. Guy. 2000. Proposed standard weight (Ws) equations and standard length categories for 18 warmwater nongame and riverine species. *North American Journal of Fisheries Management* 20:570-574.
- Carlson, H. L., L. M. Andrews, and C. W. Threinen. 1977. Surface water resources of Oconto County. Wisconsin Department of Natural Resources, Madison, WI.
- Gabelhouse, D. W. Jr. 1984. A length-categorization system to assess fish stocks. *North American Journal of Fisheries Management*. 4:273-285.

APPENDIX I – TABLES

Table 1. Stocking history since 1939 for Star Lake; Oconto County, Wisconsin.

Stocking Date	Species	Number Stocked	Size
1939	Bluegill	500	Adult
1939	Yellow perch	100	Adult
1939	Yellow perch	10000	Fingerling
1944	Largemouth bass	1500	Fingerling
1949	Largemouth bass	1000	Fingerling
1950	Largemouth bass	800	Fingerling
1952	Largemouth bass	600	Fingerling
1953	Largemouth bass	300	Fingerling
1979	Northern pike	50	Fingerling

Table 2. Accepted stock density index ranges for balanced fish populations and length categories proposed for various fish species. Measurements are minimum total lengths for each category in inches. Updated from Anderson and Neumann (1996) and Bister et al. (2000).

Species	PSD	RSD-P	Stock	Quality	Preferred	Memorable	Trophy
Black crappie		> 10	5	8	10	12	15
Bluegill	20 - 60	5 - 20	3	6	8	10	12
Brown bullhead			5	8	11	14	17
Largemouth bass	40 - 70	10 - 40	8	12	15	20	25
Muskellunge			20	30	38	42	50
Northern pike	30 - 60		14	21	28	34	44
Pumpkinseed			3	6	8	10	12
Rock bass			4	7	9	11	13
Walleye	30 - 60		10	15	20	25	30
Yellow perch	30 - 60		5	8	10	12	15
Yellow bullhead			4	8	9	11	14

Table 3. 2017-18 fishing regulations for Star Lake; Oconto County, Wisconsin.

Species	Fishing Season	Daily Limit	Minimum Length
Largemouth bass	May 7- March 5	5	14 inches
Smallmouth bass	May 7- June 17 June 18- March 5	Catch and release 5 in total with LMB	14 inches
Northern pike	May 7- March 5	5	None
Walleye	May 7- March 5	3	18 inches
Panfish (bluegill, pumpkinseed, crappie, and	Open all year	25 in total	None
Bullheads	Open all year	None	None
Rock bass	Open all year	None	None

Table 4. Relative abundance and length range (inches) of fishes sampled during 2016 survey of Star Lake; Oconto County, Wisconsin.

Common Name of Fish	June 2016			August 1994		
	Number	Percent	Length Range (Inches)	Number	Percent	Length Range (Inches)
Largemouth bass	102	74	3.1 - 15.8	85	36	2.4 - 19.5
Bluegill	21	15	3.8 - 6.9	25	11	3.6 - 8.0
Yellow perch	6	4	3.7 - 5.9	9	4	4.0 - 6.9
Rock bass	4	3	3.7 - 7.2	98	41	2.8 - 9.5
Black crappie	1	1	6.5	7	3	2.3 - 11.1
Green sunfish	2	1	3.7 - 4	5	2	3.8 - 5.6
Yellow bullhead	2	1	9.2 - 11.6			
Brown bullhead				6	3	7.8 - 10.5
Walleye				1	<1	21.2
Northern pike				1	<1	25.4
Total	136			237		

Table 5. Electrofishing catch per unit effort (CPUE) for Star Lake surveys from 1994 and 2016.

Species	Electrofishing CPUE					
	June 2016			August 1994		
	Total Catch	CPUE / mile	CPUE / hour	Total Catch	CPUE / mile	CPUE / hour
Black crappie	1	0.7	1.2	7	4.7	5.6
Bluegill	21	14.0	25.7	25	16.7	20.0
Green sunfish	2	1.3	2.5	5	3.3	4.0
Largemouth bass	102	68.0	124.9	85	56.7	68.0
Northern pike				1	0.7	0.8
Rock bass	4	2.7	4.9	98	65.3	78.4
Walleye				1	0.7	0.8
Yellow Perch	6	4.0	7.4	9	6.0	7.2

APPENDIX II – FIGURES

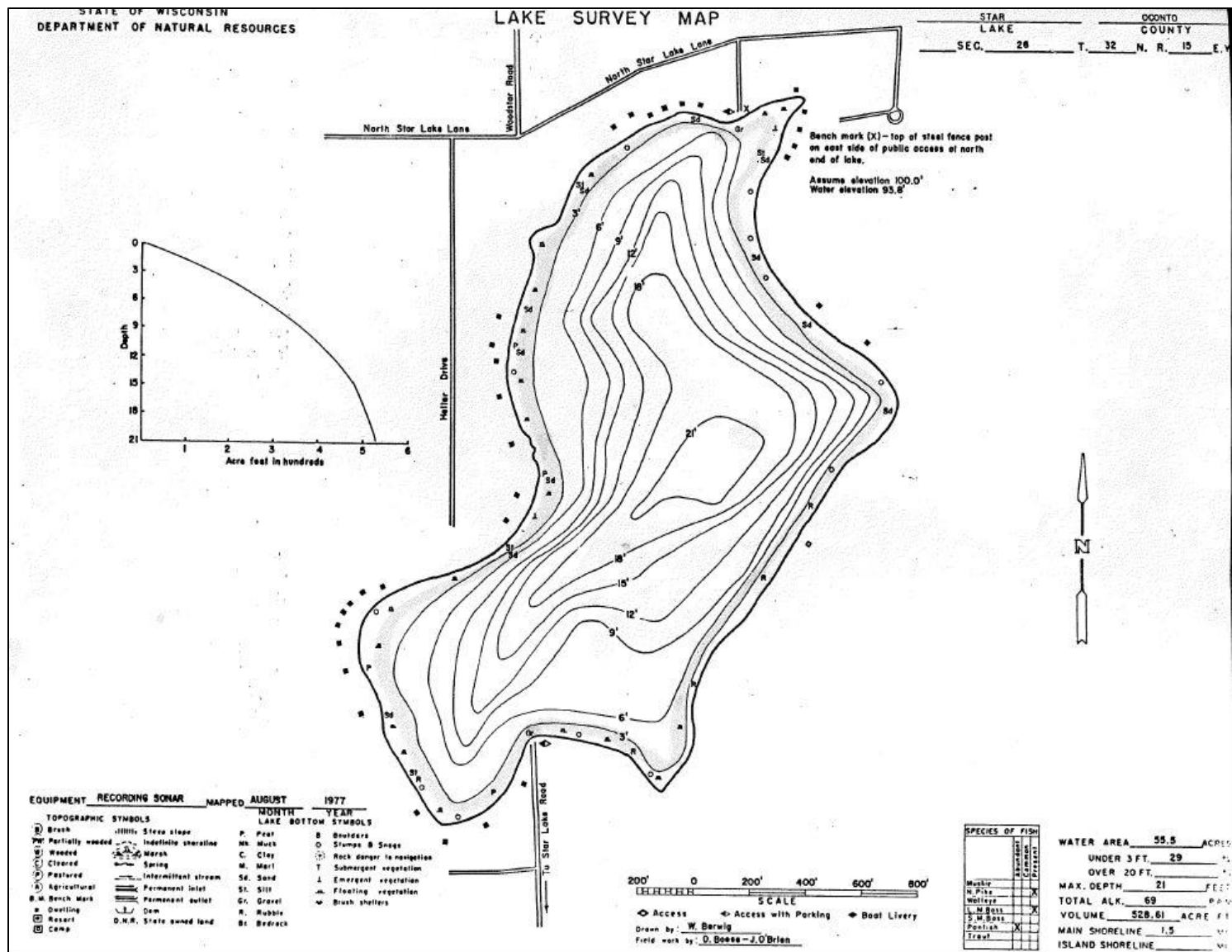


Figure 1. Contour map of Star Lake; Oconto County, Wisconsin.

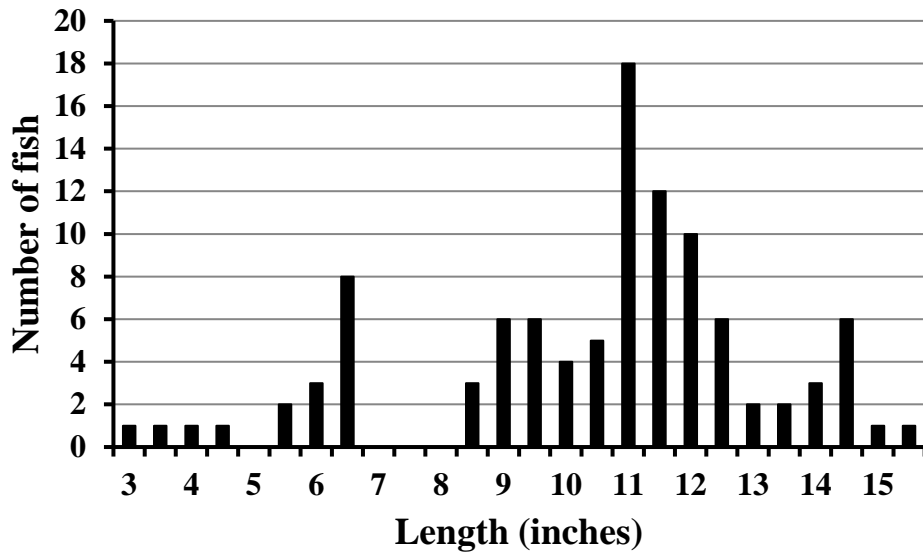


Figure 2. Length frequency of largemouth bass sampled during the 2016 survey on Star Lake; Oconto County, Wisconsin.

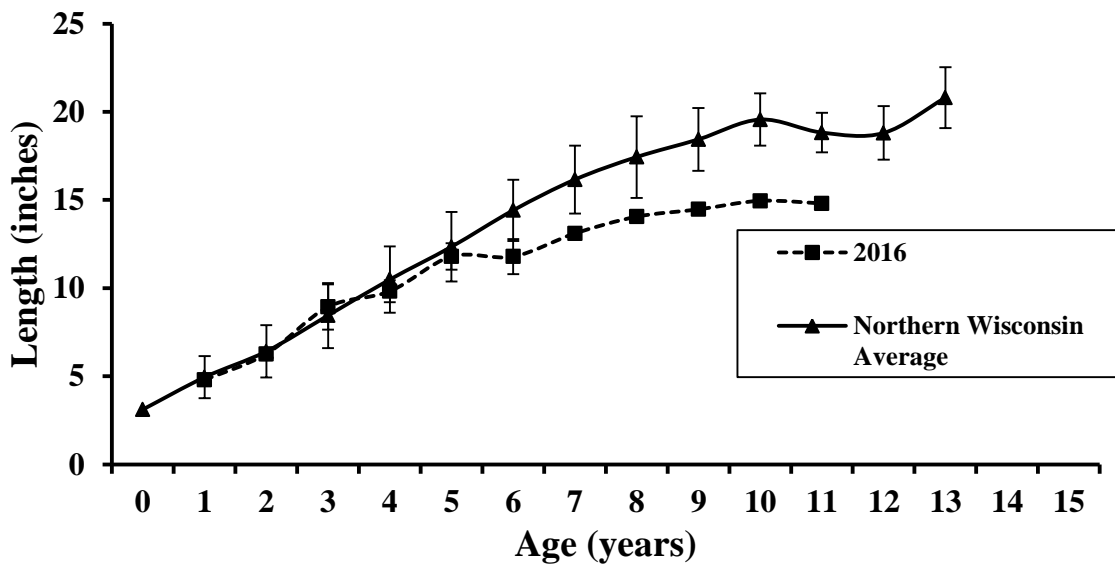


Figure 3. Mean length at age of largemouth bass sampled during the 2016 survey of Star Lake; Oconto County, Wisconsin.

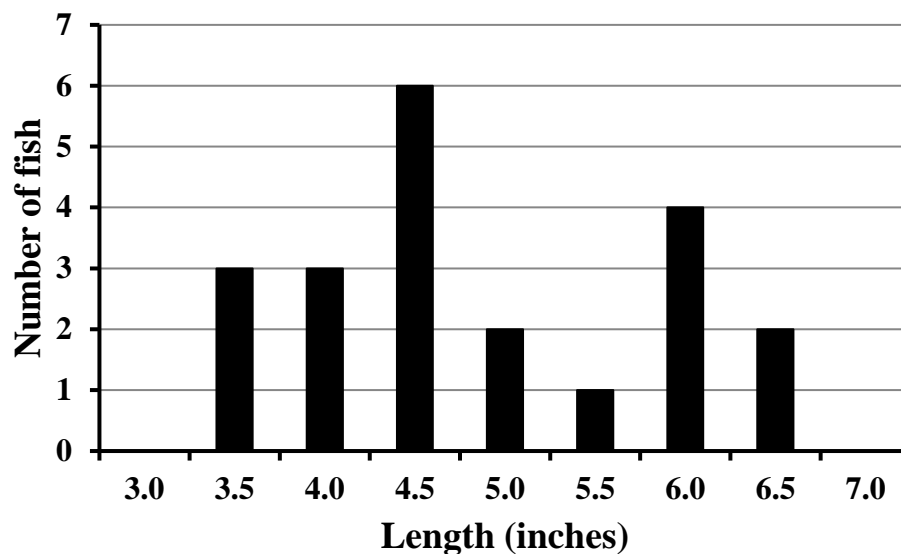


Figure 4. Length frequency of bluegill sampled during the 2016 survey on Star Lake; Oconto County, Wisconsin.

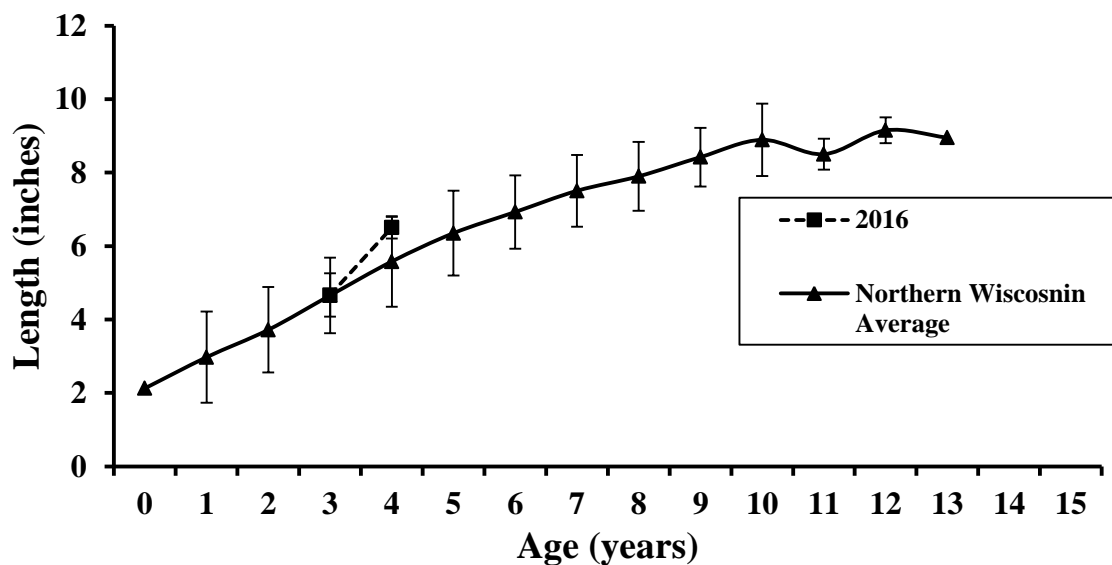


Figure 5. Mean length at age of bluegill sampled during the 2016 survey of Star Lake; Oconto County, Wisconsin.

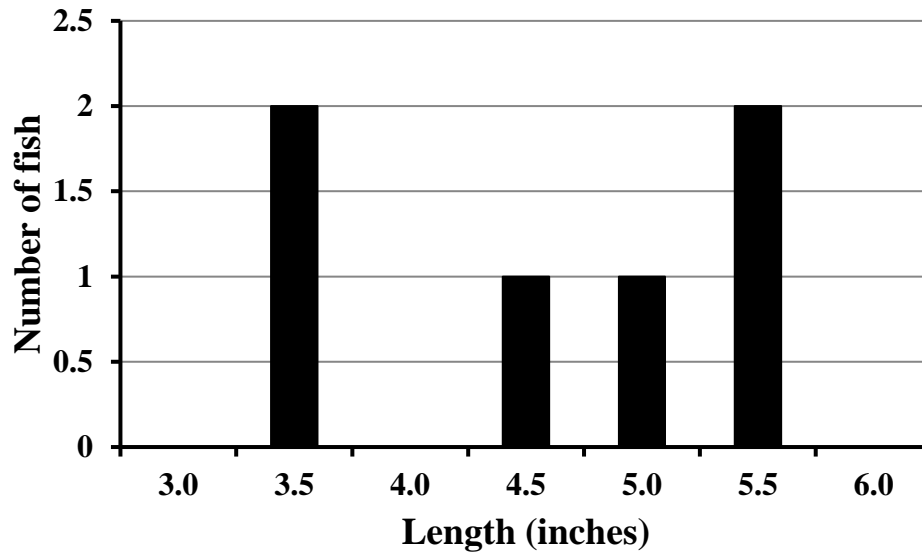


Figure 6. Length frequency of yellow perch sampled during the 2016 survey on Star Lake; Oconto County, Wisconsin.

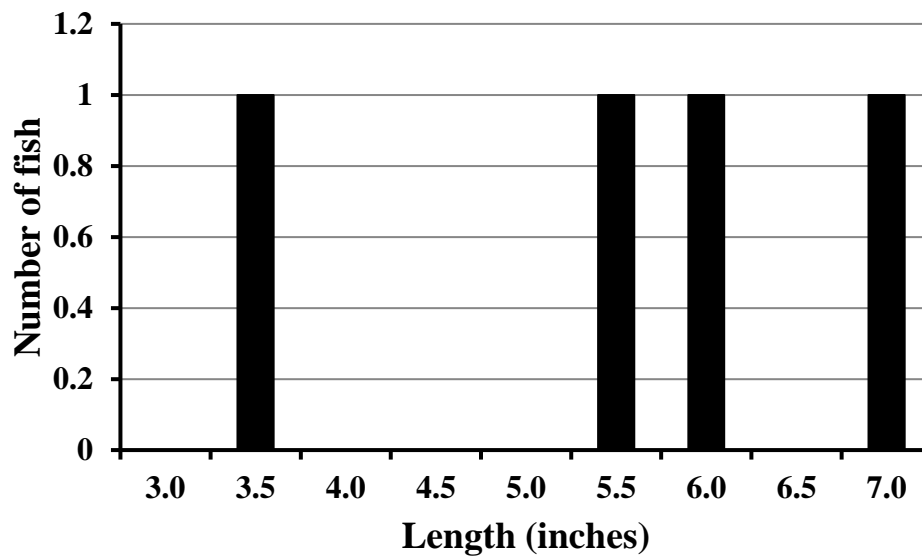


Figure 7. Length frequency of rock bass sampled during the 2016 survey on Star Lake; Oconto County, Wisconsin.